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SPEECH DISORDERS OF
CHINESE APHASICS

失语症患者的口语表达障碍研究

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内 容 提 要

　　本书从语言学的角度研究了失语症患者在口语表达过程中所表现出的语音、词汇、句法和语用障碍，并主要根据心理语言学提出的语言产生模式对这些障碍产生的原因进行了初步的心理语言学分析。

　　本书共八章。第一章为引言，主要介绍了语言与认知之间的关系以及语言产生的过程。第二章讨论了失语症产生的原因及其分类，并探讨了语言学与失语症研究方面的问题。第三章介绍了本论文中数据的搜集与整理的过程。第四章至第七章是本文的主体部分，讨论了失语症患者在语音、词汇、句法和语用四个方面的口语表达障碍。第八章，总结本研究的主要发现，并且讨论它们对于语言学和心理语言学理论的启示。

　　本书是我国目前第一本从语言学的角度研究失语症的专著。可供语言学专业的研究生和研究者、神经心理学研究者和神经科医生研究参考。

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Contents

Chapter Ⅰ   Introduction

Human language is a unique mental entity. It is a system of symbols that greatly enhances the ability of humans to represent aspects of the world, to think, and to communicate with one another. Linguists, philosophers, psychologists, and other researchers have all contributed to our understanding of what language is, and how it is acquired and used. These studies show that language has a complex structure and that its use involves many diverse, interacting psychological operations. In recent years, researchers have made considerable progress in understanding language disorders by approaching them in terms of the models of language structure and language processing developed by linguists and psycholinguists. In turn, some of these studies of language disorders shed light on the nature of normal language structure and language processing. As one of the most important parts of language processing, language production has always been studied by many researchers. In this dissertation, an effort will be made to study the speech disorders in Chinese Broca's and conduction aphasics and to make some psycholinguistic analysis about them. This introductory part is given to introduce the writer's view about the nature of language and a model of language production, which will lay a basis for the discussion in the following chapters. The last section of the chapter is to give some information about the writer's motivation for choose the topic and the structure of the dissertation.

1.1 Language production and cognition

In this dissertation, language is viewed as a code that connects certain forms (the sounds of words, sentence structures, and so on) to meanings. There is evidence that the different forms of the language code are computed by a set of processors, "components" of the language processing system, each dedicated to activating particular elements of the code (Caplan, 1993). The inputs to these processors are the representations of the language code as

well as nonlinguistic representations. For instance, a particular language processor activates the phonological forms from their meaning; another activates aspects of sentence forms from syntactic information. Caplan (1993) holds that these processors can be thought of as being "dedicated" to these tasks, in the sense that they cannot be used to accomplish other mental operations. For instance, the two processors mentioned above are not interchangeable. The language processors each make use of its cognitive "processing resources". It is an open question whether they all make use of one and the same set of resources or whether each has its own processing resource "pool", and whether the resource pool available for language processing is also used for any nonlinguistic tasks.

In the process of language production, these processors can be used in different combinations to accomplish language-related tasks such as the production of sounds, the retrieval of word forms, the matching between form and meaning, etc. The use of these processors in these tasks is under the control of other cognitive systems, such as those that deploy and shift attention, search knowledge stored in memory, match motivations to actions, to name just a few. These control mechanisms work together to affect the use of the language code at all levels. We exercise control over the entire language processing system when we decide whether or not or how to use language to convey our thoughts and intentions. We exercise control over the choice of lexical elements in our speech on the basis of our estimation of our listener's ability to understand different sets of words, the formality of the vocabulary and the syntax we choose, etc. We enunciate differently for different listeners. Some of the control is exercised consciously, but a great deal is exercised unconsciously. Unfortunately, though they are of great importance to language production, the control mechanisms involved in it, especially those that are activated unconsciously, are not well understood. We therefore have little to say about their disturbances in this dissertation.

The normal language production also requires nonlinguistic processing. When we speak, we continuously engage in searches through our semantic memory for information about the world; we continuously reason about what we are saying and hearing; we take note of our immediate environment and incorporate information about it into our language production. Language production does not take place in a cognitive vacuum. However, producing the language code itself is separable from undertaking other cognitive tasks, and its disorders must be separated from those disorders affecting these related tasks (Caplan, 1993). Thus it is reasonable for us to analyze the disorders of language production without considering the disorders of cognitive tasks.

1.2 The language code

As we have mentioned in the last section, human language can be viewed as a code that links a set of linguistic forms to a number of aspects of meaning. The basic levels of the language code include the phonological level, the lexical level, the syntactic level and the discourse level. In this dissertation, the Chinese aphasics' speech disorders are discussed in accordance with those different levels.

The lexical level of language sets up connections between concepts and categories in the nonlinguistic world. Lexical items designate concrete objects, abstract concepts, actions, properties, and logical connectives. The form of a lexical item consists of a phonological representation that specifies the segmental elements (phonemes) of the word and their organization into metrical structures (e.g., syllables). Words are assigned to different syntactic categories, such as nouns, verbs, and adjectives. Chapters 4 and 5 are devoted to the different aspects of the patients' disorders in language production at the lexical level.

The syntactic level of language expresses propositions that convey aspects of structure of events in the world (e.g., thematic roles convey who

did what to whom; attribution of modification conveys which adjectives go which nouns; the reference of pronouns and other referentially dependent categories determine which words in a set of sentences refer to the same items or actions). The propositional content of a sentence is determined by the way the meanings of words combine in a syntactic structure. Chapter 6 presents a full discussion on the patients' disorders in the production of sentences.

The propositional meanings conveyed by sentences are entered into higher-order structures that constitute the discourse level of linguistic structure. Discourse includes information about the general topic under discussion, the focus of a speaker's attention, the novelty of the information in a given sentence, the relationship of events and actions to each other (e. g. , the temporal order of events, causation), and so on. The patients' disorders in the production of discourse are analysed at length in Chapter 7.

Many of the representations, such as phonemes, syllables, morphemes, sentences and discourses, that make up the language code appear to be unique to this code. This raises the question of whether the language code is a special and separate component of mental life. Many theoretical linguists believe that it is, and argue for its uniqueness in part on the grounds that its structure is different from that needed to describe elements and operations in other cognitive domains (Chomsky, 1985). Other researchers (e. g. Bates and MacWhinney, 1989) hold different opinions. They maintain that forms of language result from the interaction of the different factors that constraint the use of the language code. These factors include the semantic values that the language code expresses (derived from human cognitive abilities), the nature of the input and output channels in which language use usually takes place (derived from the human auditory and articulatory systems), and the nature of the computations the human mind can perform (derived from physiological operations in the brain). The language code is thought to be an "emergent property" derived from these other functional systems.

Whatever the final outcome of this debate will be, it is fair to say that, at least at present, many of the properties of language code are not derivable from properties of other cognitive systems than language.

1.3 A model of language production

Based on various models of language processing system, Levelt (1989) put forward a model of language production system, which is shown in Figure 1.1.
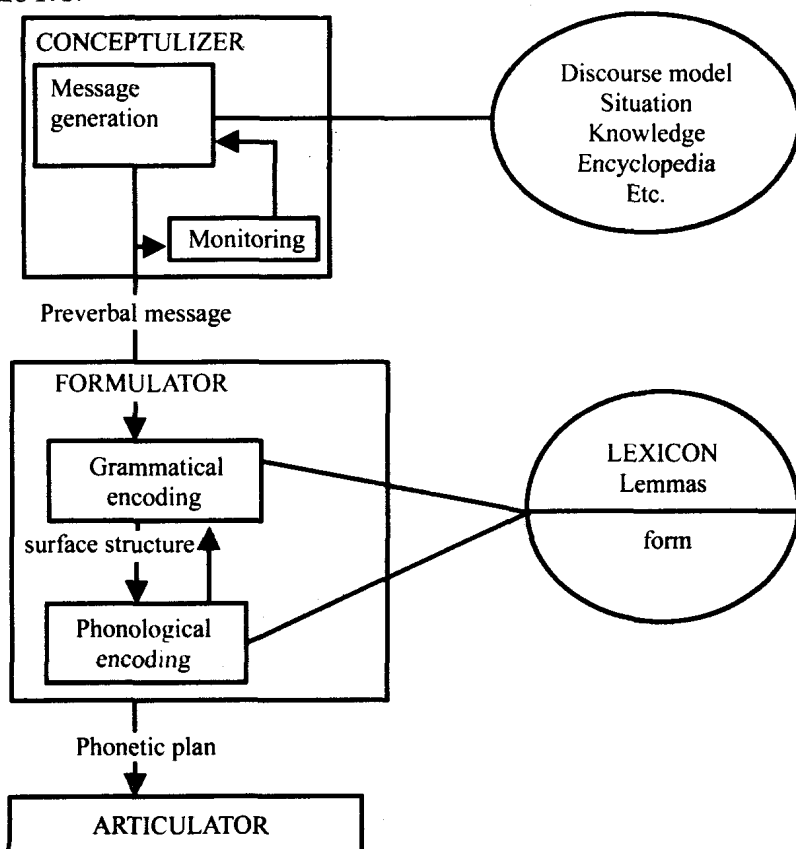

Figure 1.1   **Levelt's Model of Language Production System**

Following Levelt's model for speech production depicted in Figure 1.1, we give a short description, illustrated by an example. Assume that one wants to produce the sentence *the man kisses the woman*. The conceptulizer sends a preverbal message to the formulator. In the formulator the grammatical encoder activates the lemmas from the lexicon. It consists of procedures for accessing lemmas and syntactic building procedures. The lemmas contain word-class information, e.g., that *kiss* is a verb and *man* is a noun. The lemmas also contain information about meaning, e.g., that *man* is animate and that *kiss* needs a subject and may have an object. After the phrase *the man* is processed, the concept KISS must be grammatically encoded. The concept KISS contains the information that person, the actor, does something to person, the patient. The grammatical encoder activates the lemmas kiss from the lexicon. The syntactic lemma information is used to build the surface structure of the sentence. In this example, the syntactic lemma information is that kiss is a verb needing a subject and a direct object. The syntactic roles must be mapped into the semantic roles, in this case actor? subject, patient? object, resulting in the surface structure MAN (subject, actor) KISS (verb) WOMAN (object, patient). When the intended sentence *the woman is kissed by the man* is to be produced, the actor should be mapped into the oblique case role and the patient in the subject role.

The activated lemmas trigger the corresponding forms. These forms are used to encode the surface structure phonologically. When the correct form is retrieved from the lexicon, it must be proceeded by the phonological encoder. This processor contains the information about the phonological rules of the language.

The grammatical word-forms are also stored in the form-part of the lexicon. This means that when the verb is encoded for the third person singular in the present perfect tense, *kiss* should be phonologically encoded as

has kissed. When the correct phonemic forms are generated, articulation is planned and executed and the words are pronounced.

The above illustration only gives an outline of the process of language production. In the following we will discuss it in more detail.

1.3.1 Oral production of words

According to Levelt (1989) the process of oral production of words consists of a series of activities including accessing lemmas, accessing lexical phonological representations and articulation. Articulation is the final stage of oral production of words. It refers to the actual movement of the vocal tract to produce linguistically appropriate sound. It is assumed that all the subjects in our study have no problem with the apparatus related with the oral production. Therefore we will not discuss them in this section for the sake of saving space.

1.3.1.1 Accessing lemmas

When we speak, we convert thoughts into linguistic forms. One crucial step in this process is activating the words that correspond to elements of thought. Most researches assume that this process involves matching aspects of a concept to some part of the representation of the meaning of a word. Concepts serve to divide the world into units, some of which make contact with words. For instance if a speaker wishes to convey the information that *a dog is eating a bone*, he or she must first divide the thought into elements that correspond to the meanings of the word *dog*, *eat*, etc., in order to match each of these parts of the complete thought with words. The process of matching concepts to words is likely to differ in some ways for different sorts of words. The concepts corresponding to common nouns are quite different from those that correspond to abstract nouns. The former, but probably not the latter, can activate visual images that may become part of the mediating process between concepts and words. Logical connectives such as

and, *but*, *if* and *or* are different again, as are prepositions, articles, and some other lexical elements.

In addition to semantic facts relating tó the items, actions, and properties a speaker has in mind, other factors also are relevant to the choice of words in speech. Syntax is one of these factors. When a speaker is looking for a word during sentence production, he or she often knows that the word must be of a certain grammatical categories (noun, verb, etc.) to fit into the sentence that will be (or already begun to be) constructed. Other factors, such as whether an item has been mentioned in the discourse, will affect a speaker's choice of a word, a pronoun, or even whether to delete an item. Speakers use different words when talking to different listeners (e.g., children vs. adults). Thus the search for a word is usually based upon syntactic, pragmatic and intrinsic semantic information.
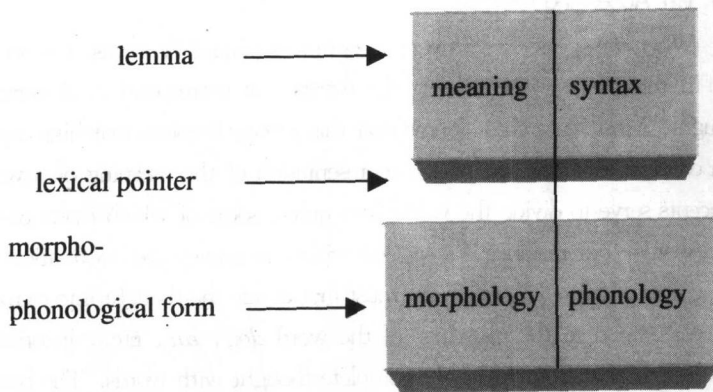
Figure 1.2　**A lexical entry consisting of a lemma and a morphological form**
(**From Levelt**, 1989:188)

Many theorists maintain that what is initially activated by concepts and other information sources is only part of what we ordinarily mean by the

term word. A word includes at least four different types of information, depicted in Figure 1.2. Two of these information types — the meaning of a word and the syntactic information associated with it — have been thought to be separable from the other two. These two information types have been called a word's lemma (Kempen and Huijbers, 1983; Levelt, 1989). The activation process we are considering is those that activate a lemma.

We have been focusing upon retrieving words that correspond to what we may call single concepts, such as *dog*, *eat*, etc. However, not all concepts are related to simple words (e.g., the concept THE DOG ATE cannot be expressed as a single word in English). But the opposite is also true: not all words correspond to simple concepts. The word *eating* refers to the action of eating going on over time; it contrasts with the meaning of the word *eaten*, which refers to eating that has been completed. This means that some words are selected on the basis of the combination of several concepts. Languages differ significantly as to whether single or combined concepts are expressed as single words, or as derived or inflected words, or as both of the latter. Fortunately, Chinese is comparative simpler in that it has no inflectional morphology, i.e., no verb conjugations and no noun declensions of any kind.

Several models have been proposed of how word selection happens. One model that has been frequently cited in the aphasia literature is the logogen model proposed by Morton (1969, 1979a, b). In his logogen model, logogens are information-collecting units that serve to activate lexical items. These units have resting activation levels that are determined by factors such as their frequency of occurrence in the language. When the information of any sort — semantic, syntactic, phonological — all that is related to a lexical item is presented to the logogen, its resting activation level rises. This level decays over time but remains above its resting level for some time once